RAMCO INSTITUTE OF TECHNOLOGY

RAJAPALAYAM

Dept. of Computer Science and Engineering

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Collaborative Learning: Student Teams-Achievement Divisions (STAD)

Planning and Implementation Document of STAD

List of Activities

- **Online Graded Discussion**
- **Online Quiz**
- **Group Presentation**

Topic: MAC protocols

1. Outcomes

- Explain the basics of mobile computing and MAC protocols (L2, CO1)

2 Justification for choosing the topic on Implementation of Service Oriented Principles

Recently, wireless Network is one of the rapid emerging technologies. It covers large application area such as civilian and military. Wireless Network consists of nodes or devices such as Mobile station, laptop, palmtop and PDA multifunctional activities to communicate each other through the wireless medium. MAC protocols play the major role to access the wireless media in an efficient manner. The objective of collaborative learning is to enhance communication, creativity and basic knowledge of MAC protocols. This topic also plays the major role in this course. STAD collaborative learning technique consists of series of activities and assessments that enable students to master the functionalities of various MAC protocol. It emphasizes the effective group interaction among students to master the MAC protocol.

3 Objectives (At the end of the learning technique, the students will be able to)

- Enhance communication, listening, Self-confidence and self-learning

4 Concept teaching

Initially, I delivered a lecture on Various MAC protocol Schemes such as Fixe Assignment Schemes, Random Assignment Schemes and Reservation Assignment Schemes to students based on *ARCS model*. I address the context or importance of MAC protocols in civilian and military application for communication ensures attention of the students. Then, I explain these protocols in relevance to GSM, GPRS and LTE system. Frequently, I threw the poll questions regarding principles of various schemes that alert the student's attention. Also, I played a short video lecture on FDMA and CDMA. (https://www.youtube.com/watch?v=CkhA7s5GIGc).

5 Team formations

Heterogeneous group with four members were formed based on the students willingness. Each group is formed with bright student, average student and slow learners. Classification of students such as *bright student, average student and slow learners* are based on their background, academic performance (bright/average/slow learner) and skill. Team leader is identified and assigned to each group based on his/her academic performance and skill. Team members selected a team name based on their interest. Table 1shows the selected team name by students.

Table 1: Team Name

S.no	Name	No. of Students
1	Blossoms	4
2	Nameless	4
3	Five stars	5
4	Mars	4
5	Evil Boys	4
6	Killer Boys	4
7	Team3	4
8	Team 4	4
9	Power Puff Girls	4
10	Lightning Crackers	4
11	Phoenix	4
12	Team1	4
13	Fantastic four	4
Total		53

I encouraged the students to master the MAC protocols and prepare well for quiz, online graded discussion and group presentation. A group member's discussed themselves to make good presentation to score high grade.

6 STAD Activities

The following three activities were conducted in STAD collaborative learning technique. The schedule of all the activities is given in the Table2.

1. **Graded Discussion**
2. **Online Quiz**
3. **Group presentation**

Table 2: Date of Implementation of the Activities

Sno	Activities	Date and Time
1	Graded Discussion	Work at home
2	Online Quiz	9.1.2020, 30 minutes(10.55 am to 11.45 am)
3	Group presentation	13.01.2020, 50 minutes(4.10 pm to 5.00 pm)

6.1 Evaluation of Individual and Group Performance

Students' performance can be evaluated using formative and summative assessment methods. It is an effective tool to evaluate various skills of students.

6.2 Graded Discussion

The objectives of the discussion are to *encourage peer to peer learning, critical thinking and reflection.* I gave a discussion topic on "MAC protocol". Based on the concepts teaching and reading materials, students able to post response/ ideas and respond to the post of at least one of their friends. Figure 1shows the sample Evaluation of Graded discussion and feedback.

6.2.1 Rule

- Your initial response is within due**.** This will give a few days to you and your peers to comment on each other's posts.
- You will not be able to see your peers' post till you have posted your own
- The discussion closes on dead line**.**

6.2.2 Graded discussion: Individual Formative assessment ($GDIS_i$) – 10 marks

- The initial response is posted within the deadline (GDIS1)- **(1 mark)**
- The question/all parts of the question are addressed directly(GDIS2)- **(3 marks)**
- The response is well reflected, and based on personal opinion and experience(GDIS3)-
  (3 marks)
- Active/constructive interaction with different peers' posts((GDIS4) **(2 marks)**
- The posts are well composed and proofread ((GDIS5)-**(1 mark)**

$GDIS_i$ **= GDIS1+ GDIS2+ GDIS3+ GDIS4+ GDIS5 , where i =1 to 5**

6.3 Online Quiz.

It carries 20 marks. It contains 20 multiple choice type questions. The objective of online quiz is to gives an overview of the concept and gets immediate results of the students. There is no need teacher and set timer to access student's skill. Figure 3 shows the Quiz summary for all the students.

Online Quiz: Individual Formative assessment – (QIS_i)-20 marks

- Correct Answer QIS_i

6.4 Group Presentation (GPS)

The goal of group presentation is to refine the concepts or develop an idea based on the previous activities such as concept teaching, discussion, and quiz**.** Through this, *students are able to develop various skills like leadership, interpersonal skill and team and time management skill*. The Table 3 shows the rubric of group presentation. The guidelines of Guidelines for finding Individual score and team score are shown in Table 4.

6.4.1 Individual formative Assessment – (QIS_i)-15 marks

- Knowledge of Course Content – 5 marks
- Pronunciation and Enunciation/Time Management– 5 marks
- Group Coordination- 5 marks

$$QIS_i =QIS1 + QIS2 +QIS3 +QIS4, \text{ where } i =1 \text{ to } 4 \text{ or } 5$$

6.4.2 Group Presentation (GPS): Group Summative Assessment 5 marks

Table 3: Rubric of group presentation.

Evaluation criteria	Excellent 5.0 >3.0 pts	Good 3.0 >2.0 pts	Satisfaction 2.0 >1.0 pts	Marks
Knowledge of Course Content	The presenter sustained the interest of the audience in innovative ways with excellent subject knowledge.	The presenter kept the attention of the audience the whole time with good subject knowledge	The presenter has somewhat kept the audience's attention with subject knowledge	5
Pronunciation and Enunciation/Time Management	Attract the audience with a clear voice and the best vocabulary. Delivered professionally and answered quires within the allotted time	The presenter has somewhat attracted to the audience with vocabulary. Delivered and answered quires beyond the allotted time	The presenter was not attracted to the audience with vocabulary. Delivered and answered quires beyond the allotted time	5
Group Coordination	The presentation was divided equally to individual in a group. The individual performed excellently.	The presentation was somewhat divided to an individual in a group. An individual was somewhat performed well	The presentation was not equally divided into an individual in a group. An individual was not performed well	5
			Total	15

Table 4: Guidelines for finding Individual score and group score

Team #	Graded Discussion	Online Quiz	Group Presentation	
	Individual score (GDIS) 10 Marks	Individual score (QIS) 20 Marks	Group Individual Score 15 marks	Group Score (GPS) 05 Marks
Team N	GDIS1	QIS1	GIS1	GPS
	GDIS2	QIS2	GIS2	
	GDIS3	QIS3	GIS3	
	GDIS4	QIS4	GIS4	
Total (Team $_i$)	$\sum_{i=1}^{n} GDIS_i$ Where n= 1 to 4 or 5	$\sum_{i=1}^{n} QIS_i$ Where n= 1 to 4 or 5	$\sum_{i=1}^{n} GPIS_i$ Where n= 1 to 4 or 5	GPS

Where GDIS- Graded Discussion Individual Score, QIS- Quiz Individual Score, GIS-Group Presentation Individual Score, GPS- Group Presentation Score. Figure 2 and Figure 3 shows the sample evaluation based on the rubrics for group presentations.

6.5 Final Individual and Team score

The final individual score and team score will be calculated based on the formative and summative assessment method to five STAD assessments such as, Graded Discussion written, online Quiz and Group presentation. The final core is calculated as given formulas.

Final Individual Score $(FIS_i) = (GDIS_i) + (TIS_i) + (QIS_i) + (GIS_i + GPS)$, where i =1 to 4 or 5

Final Team Score $(FTS_i) = (\sum_{i=1}^{n} GDIS_i) + (\sum_{i=1}^{n} QIS_i) + (\sum_{i=1}^{n} GPIS_i) + GPS$, where n =1 to 4 or 5

6.6 Team-wise scores of the class

Highest score - Nameless -   99.65

Lowest score- Five Stars -   75.35

Median   -   92.9

Team Nane	Five stars	Team 3	Fantastic four	Blossoms	Power Puff Girls	Team4	Team 1	Evil Boys	Lightning Crackers	Killer Boys	Phoenix	Mars	Nameless
Score	75.35	84.9	85.75	89.5	91.5	92	92.9	93.4	94	96.1	98.4	98.5	99.65
							Median						High score

Table 5: Team-wise scores and analysis

Team Name	No. of Students	Team Score (Median Score=)	Team Performed less than median score (Yes/No)	One most Important reason for teams performance
Five stars	5	**75.35** (Median = 92.9)	Yes **75.35<92.9**	An average student was absent in discussion and online Quiz. A slow learner was not performing well in Online Quiz. The team has a *lack of team coordination* while participating in the discussion and presentation sessions. They are *not performing well in the presentation.*
Team 3	4	**84.9** (Median = 92.9)	Yes **84.9>92.9**	A slow learner was absent in Quiz. The team has good *communication, coordination* during the presentation. An average student was not performing well in group presentation.
Fantastic four	4	**85.75** (Median = 92.9)	Yes **85.75>92.9**	All the team members including *slow-learners* who have actively participated in the *discussion and presentation* session. An average student was absent in Quiz.
Blossoms	4	**89.5** (Median = 92.9)	Yes **89.5<92.9**	The slow-learners have not participated in brainstorming session and presentations. They provide the *wrong information* in

			the discussion and a *lack of communication*. They did well in the quiz activity. *Coordination and critical thinking is missing.*
Power Puff Girls	4	**91.5** (Median = 92.9)	Yes **91.5<92.9**	The average students are not performing well in all the activities. Somehow they are performing well in the presentation. *Communication was achieved. Coordination was somewhat missing.*
Team 4	4	**92** (Median = 92.84)	Yes **92<92.9**	The average student is performing well in discussion and presentation. An average student is not performed well in presentation. *Communication was achieved*
Team 1	4	92.9 (Median = 92.9)	No 92.9=92.9	One student is *absent* in discussion. Others are performing well in all the activities. One average learner is not cooperating with the peer during presentation
Evil Boys	4	**93.4** (Median = 92.9)	No **93.4>92.9**	The bright students are not participating well; they are focusing the same point in the discussion. They are having *subject knowledge* because they did well in the quiz..
Lightning Crackers	4	**94** (Median = 92.9)	No **94 >92.9**	Two students are somewhat performing well in *discussion and presentation* and other two students are performing well in all the activities.
Killer boys	4	**96.1** (Median = 92.9)	No **96.1>92.9**	All the students are performing well and contributing equally in all the activities. *Communication, coordination and outcome were achieved.*
Phoenix	4	**98.4** (Median = 92.9)	No **98.4>92.9**	The slow learners and average students are performing well in all the activities. *Communication, coordination and outcome were achieved.*
Mars	4	**98.5** (Median = 92.9)	No **98.5<92.9**	All the team members contributed *well to all the activities*. They were providing a *very good presentation with* stylish communication and coordination. *Fast-learners lead* the team very well/ *Communication , coordination and*

Team name								
Nameless	4	**99.65** (Median = 92.9)	No **99.65**<92.9	All the team members contributed *excellent in all the activities*. They were discussing the *constructive ideas* in discussion and presentation with excellent communication and coordination. *Fast-learners lead* the team very tactfully. *Communication, coordination and outcome were achieved.*				

Table 6: Detailed score of STAD activities

Team name	Sno	Name of the student	Graded Discussion Individual score (GDIS) 10 Marks	Online Quiz Individual score (QIS) 20 Marks	Group Presentation Individual Score 15marks	Group Score (GPS) 5 Marks	Individual score 100 Marks	Team score 100 Marks
Mars	1	AISHWARYA A	10	20	15		100	
	2	MUTHULAKSHMI S	8	20	14		94	
	3	RAGA PRIYA K	10	20	15	5	100	98.5
	4	SELVA ISHWARYA R	10	20	15		100	
		Average	9.5	20	14.75	5	98.5	
Evil Boys	1	MADHANKUMAR M	9.3	18	14		92.6	
	2	MOHAMEDRISHWAN J	9.5	20	14.5	5	98	
	3	SHAHITH AKEEL M R	10	19	15		98	93.4
	4	SURYA M	10	18	14.5		85	
		Average	9.7	18.75	14.5	5	93.4	
Killer Boys	1	GOWTHAM P	9.5	20	14.5		96	
	2	PRASANNA KUMAR G	9.7	20	14.5	4	96.4	
	3	PUSHPAVANAM SABARISH V	9.4	20	15		96.8	96.1
	4	SATHYA PRAKASH K	9.6	20	14		95.2	
		Average	9.55	20	14.5	4	96.1	
Team3	1	SUKIN M	10	20	15		98	
	2	YOGESH LOGANATH M	10	20	15	4	98	
	3	GURUANAND G	9.6	A	14		55.2	84.9
	4	KUMARESAN R	9.2	18	13		88.4	
		Average	9.7	14.5	14.25	4	84.9	
Team 4	1	KAVIN NARESH G R	10	19	14		94	
	2	SRIRAM KARTHIKEYAN R	10	18	13	4	90	92
	3	SUDARSANA RAMJI V	10	18	14		92	

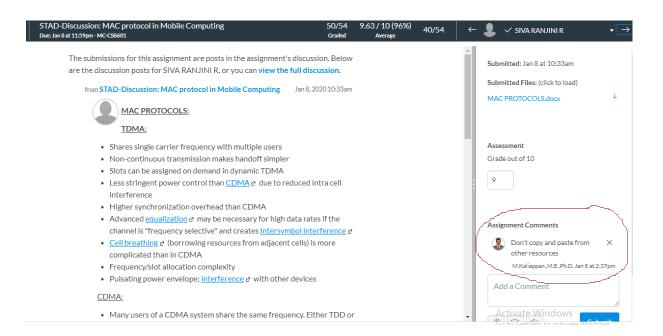| Team	No.	Name						
	4	PRABHU M	9	20	13		92	
		Average	9.75	18.75	13.5	4	92	
Power Puff Girls	1	JEGATHA C	10	18	15		95	
	2	GAYATHRI A	10	17	14	4.5	89	
	3	RATHIKA A	10	16	14		89	91.5
	4	SASI REKHA M	10	17	15		93	
		Average	10	17	14.5	4.5	91.5	
Lightning Crackers	1	ANUSHREE M	10	17	14		92	
	2	GOWSALYA S	10	19	14	5	96	
	3	PAVITHRA M	10	16	15		92	94
	4	MUTHURANI M	10	18	15		96	
		Average	10	17.5	14.5	5	94	
Phoenix	1	MAHALAKSHMI S	9.8	18	14.5		94.6	
	2	PRIYADHARSINI K	9.5	20	15	5	99	
	3	SUJITHA S	10	20	15		100	98.4
	4	DEEPTHISRI V	10	20	15		100	
		Average	9.8	19.5	14.8	5	98.4	
Team1	1	GAYATHRI DEVI T	0	19	15		78	
	2	RAJEE K	10	20	15	5	100	
	3	NARMADHA S	9.8	18	14		93.6	92.9
	4	MARIAANTONYROSY V	10	20	15		100	
		Average	7.45	19.25	14.75	5	92.9	
Fantastic four	1	APARNA M	10	19	14		95	
	2	KRISHNA VENI S	9.5	18	14	4.5	92	
	3	SANDHIYA S	10	A	15		61	85.75
	4	YESHWANTHINI S	10	18	15		95	
		Average	9.87	13.75	14.5	4.5	85.75	
Blossoms	1	ANUSUYA T	10	17	14		90	
	2	AJITHA J	8	20	14	4	92	
	3	SUBASHINI M	8	19	14.5		91	89.5
	4	VAISHNAVIDEVI A J	8	17	13.5		85	
		Average	8.5	18.25	14	4	89.5	
Nameless	1	RAJARAJESWARI P	9.7	20	15		99.4	
	2	MADHUSHREE J	10	20	15	5	100	
	3	KARTHIKA C	10	20	15		100	99.65
	4	VASUKI S	9.6	20	15		99.2	
		Average	9.8	20	15	5	99.65	
Five stars	1	SIVA RANJINI R	9	19	15		95	
	2	DIVYAPANDIAN K M	8	20	15		95	
	3	SUSMITHA M	9.7	11	13	4.5	76.4	75.35
	4	VARSHA V	0	A	13		35	
	5	AISHWARYA K	9.4	13	13		79.8	
		Average	7.2	12.6	13.8	4.5	75.35	

Figure 1: Sample Evaluation of Grades discussion
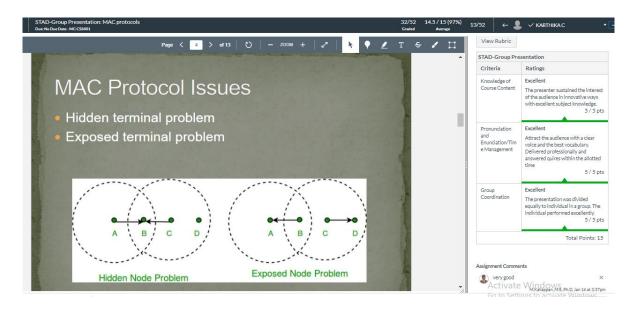

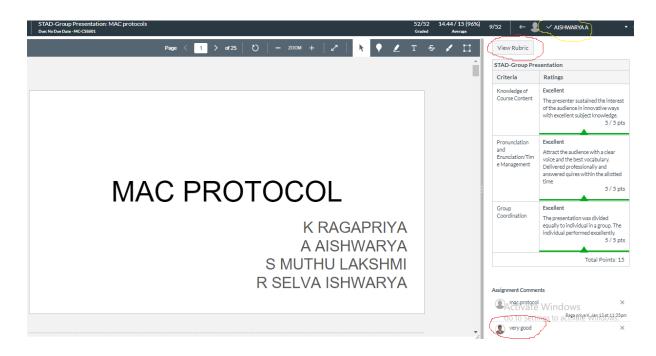**Figure 2: Sample Evaluation of Group presentation**

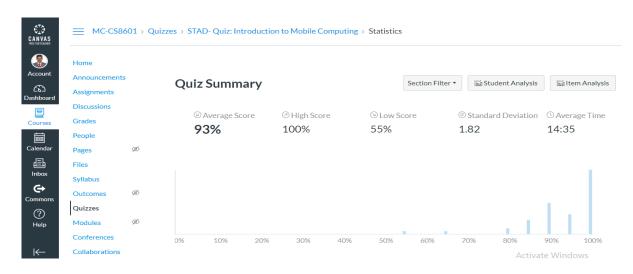**Figure 3: Sample Evaluation of Group presentation**

Figure 4 : Quiz Summary for Student Analysis

6.5 Feedback questionnaires' for STAD

The feedbacks are collected using the following questionnaires. Feedback questionnaires posted on the Canvas Course website. It is used to assess the success of the STAD and get more insight into the activities like positive or negative. The first question assesses the *student's willingness* whether the students like this activity or not. The second question measures

the objectives and outcomes of this activity. The third question asks the students comments to improve the learning strategies.

FEEDBACK

1. Are you like STAD learning activity?

☐ Yes

☐ No

2. The STAD learning activity gives me greater opportunities to enhance my interpersonal skills like communication, listening, team work and leadership.

☐ Strongly Agree

☐ Agree

☐ Disagree

4. Give 2 benefits and 2 challenge you faced during collaborations

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7. Reflective critiques

✓ This **heterogeneous team** boost the confidence of bright students and they get the *satisfaction of assisting the slow-learners*

✓ Always, slow-learners had hesitant to raise their quires to the teacher while learning. In the practice of the heterogeneous groups, slow learners ask their queries with *peers without hesitant and share their critiques*.

✓ *Diversity responses* can be formulated to achieve objectives and outcomes.

✓ I informed students that kindly give *feedback or suggestion* during the discussion when they felt not comfortable.

✓ I *suggested a few key concepts* during group presentation when the slow learners are not participating. It boosts the confidence level to start their online discussion.

✓ One or two students of a group are only presented during presentation. I insisted each student in the groups should present at least two points.

7.1 Strategies to open a deadlock situation.

I considered the followings are the deadlock situation.

- ❖ Not starting discussion during online discussion
- ❖ Deviate from the key concepts

I had given tips to a team those who have not started the online discussion. I pointed out the *deviation from the correct* discussion when they are out of the discussion topic.

8 Conclusions

The selected topic is playing a vital role in civilian and military applications. STAD technique is used to assess the students' performance in continuous progress. STAD consists of three activities such as *Graded Discussion, Online Quiz, and Group presentation*. The student's performance could be assessed by formative and summative evaluation tools to achieve objectives and outcomes. Through the STAD learning technique, student enriches various skills like as communication, cooperation, leadership, and interpersonal skill.

Glimpse

Graded Discussion	Online Quiz

References

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2. Dian Mita Nurhayati and Hartono, Implementation of Cooperative Learning Model Type STAD with RME Approach to Understanding of Mathematical Concept Student State Junior High School in Pekanbaru, AIP Conference Proceedings 1848, 040002, 2017, https://doi.org/10.1063/1.4983940.

3. Micheal M van Wyk, The Effects of the STAD-Cooperative Learning Method on Student Achievement, Attitude and Motivation in Economics Education, Journal of Social Science pp. 261-270, 2017, •   https://doi.org/10.1080/09718923.2012.11893104